United States Army Aviation Center
Fort Rucker, Alabama
JANUARY 2003

STUDENT HANDOUT

TITLE: UH-60 PERFORMANCE PLANNING

FILE NUMBER: 4758-3

PROPONENT FOR THIS STUDENT HANDOUT IS:

Aviation Training Brigade
ATTN: ATZQ-ATB-AD-C
Fort Rucker, Alabama 36362-5000

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NOTES

TERMINAL LEARNING OBJECTIVE (TLO):

At the completion of this lesson the student will:

ACTION: Complete a Performance Planning Card (PPC) DA Form 5703-R.

CONDITION: As a UH-60 aviator.

STANDARD: In accordance with (IAW) TC 1-212, TM 1-1520-237-10 and TM 1-1520-237-CL.

SAFETY REQUIREMENTS: None.

RISK ASSESSMENT LEVEL: Low.

ENVIRONMENTAL CONSIDERATIONS: None.

EVALUATION: Each student will be evaluated on this block of instruction by their Instructor Pilot.

A. ENABLING LEARNING OBJECTIVE (ELO) #1:

ACTION: Define the purpose of the Performance Planning Card (PPC) 5703-R.

CONDITION: Given a blank DA Form 5703-R, TC 1-212, TM 1-1520-237-10, and TM 1-1520-237-CL.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, and classroom instruction.

a. Purpose of the Performance Planning Card (PPC)/DA Form 5703-R.

(1) Used to record data applicable to the mission.

(2) Knowledge of your performance margin will allow you to make better decisions when unexpected conditions or alternate missions are encountered.

(3) Situations requiring maximum performance will be more readily recognized.

(4) Familiarity with the data will allow performance to be computed more easily and quickly.

(5) Experience will be gained in accurately estimating the effects of variables for which data are not presented.

B. ENABLING LEARNING OBJECTIVE (ELO) #2:

ACTION: Describe the four major sections of the Performance Planning Card (PPC) 5703-R.

CONDITION: Given a blank DA Form 5703-R, TC 1-212, and TM 1-1520-237-10, and TM 1-1520-237-CL.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, and classroom instruction.

a. The four major sections of the 5703-R:

(1) Departure

(2) Remarks

(3) Cruise

(4) Arrival - Complete this section if arrival conditions at destination differ significantly from departure conditions. A significant change is defined as any one of the following:

(a) An increase of over 10 degrees C, 2,000 feet PA, and/or 1,000 pounds gross weight.

(b) An increase or decrease of an Engine Torque Factor (ETF) by 0.03 or more.

C. ENABLING LEARNING OBJECTIVE (ELO) #3:

ACTION: Define terms associated with the Performance Planning Card (PPC) 5703-R.

CONDITION: Given a blank DA Form 5703-R, TC 1-212, and TM 1-1520-237-10, and TM 1-1520-237-CL.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL and classroom instruction.

a. Definition of terms.

(1) Chapter 7 verses Chapter 7A and the –CL (-10, Page 7-1, NOTE)

(2) Limits (-10, Paragraph 7.4, CAUTION)

(3) Clean/High Drag Configuration (-10, Page 7-3, Para 7.7)

(a) The data presented in the performance charts is primarily derived from a “clean” or “high drag” configured UH-60A/L aircraft.

(b) Clean Configuration (-10 Paragraph 7.7) - Assumes all doors and windows are closed and includes fixed provisions for the ESSS, main rotor de-ice system, mounting brackets for the IR jammer and chaff dispenser, HIRSS with baffles installed and the wire strike protection system. Aircraft which have an external configuration that differs from the clean configuration may be corrected for drag differences on cruise performance as discussed in –10, Chapter 7, Section VI (Drag).

(4) Torque Factor Terms (-10, Paragraph 7.10 & 7.10.1)

(a) Engine Torque Factor (ETF).

1 The comparison of an individual engine’s torque available to a specification engine’s (1.0 ETF) torque available at a reference temperature of 35° Celsius.

2 The ETF must be in the range of 0.85 to 1.0.

3 The ETF indicates degradation of performance based on engine usage.

(b) Aircraft Torque Factor (ATF).

1 ATF is the average of the two ETFs. It indicates the aircraft's total performance capability based on the condition of the two engines.

2 ATF is based on 35° Celsius and is allowed to range from 0.9 to 1.0. If the ATF is not within this range, do not fly the aircraft.

NOTE: ETF and ATF values can be found in the aircraft engine on the hit check log.

(c) Torque Ratio (TR). An adjustment of ATF and ETFs for actual ambient temperature.

1 Torque factor chart indicates improved engine and aircraft performance as temperature decreases below +35° Celsius.

(5) Engine Bleed Air (-10, Paragraph 7.12)

(6) HIRSS (-10, Paragraph 7.13)

(7) Fuel Flow (-10, Paragraph 7.17 C 1 & 2)

D. ENABLING LEARNING OBJECTIVE (ELO) #4:

ACTION: Determine the use of the Performance Planning Card (PPC) 5703-R.

CONDITION: Given a blank DA Form 5703-R, TC 1-212, and TM 1-1520-237-10, TM 1-1520-237-CL, all applicable environmental conditions, takeoff gross weight(s), and the ETF's for the #1 and #2 Engines.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL and classroom instruction.

a. Use of the PPC.

(1) To determine and have available aircraft performance data required to complete the mission.

(2) To organize performance planning data required for the mission.

(3) A 5703-R will be completed, in it's entirety, for the following:

(a) RL progression training, annual ATP evaluations, and when required during other training and evaluations.

(b) When the planned or actual aircraft gross weight for departure and/or arrival is within 3,000 pounds of the maximum allowable gross weight OGE or when the planned or actual gross weight is within 3,000 pounds of the maximum allowable gross weight for cruise. To determine if the DA Form 5703-R must be completed, perform the following procedures:

1 Record the following information in the Departure Section of the 5703-R (PPC):

a. **PA** – Record the forecast maximum pressure altitude for the mission and pressure altitude for the time of departure.

b. **FAT** – Record the forecast maximum free air temperature for themission and the free air temperature for the time of departure.

c. **Aircraft GWT –** Record the planed aircraft gross weight at takeoff. This includes the aircraft basic weight, internal load, total fuel, and when applicable, ESSS stores (exclude sling load).

d. **ATF/ETF** – Record the ATF and ETFs in the appropriate blocks.

2 Record the following information in the Cruise Section of the 5703-R (PPC):

a. **PA** – Record planed cruise pressure altitude.

b. **FAT** – Record forecast temperature at the planned cruise pressure altitude.

3 Record the following information in the Arrival Section of the 5703-R (PPC):

a. **PA** – Record forecast pressure altitude for time of arrival. If unavailable, use maximum forecast pressure altitude for the mission.

b. **FAT** – Record forecast temperature for time of arrival. If unavailable, use maximum forecast temperature for the mission.

c. **LANDING GWT** – Record the estimated gross weight for arrival.

4 **TR's** - Use the aircraft TORQUE FACTOR chart to compute torque ratios as described below.

a **Step 1:** Enter the appropriate aircraft TORQUE FACTOR chart on the left at the appropriate FAT. Move right to the ATF or ETF.

b **Step 2:** Move straight down to the bottom of the chart and record the **TR**.

c **Step 3:** Repeat steps 1 and 2 as necessary to compute for ETF's and ATF.

NOTE: Two instances when the chart is not needed: (1) If ambient temperature is 35°C or above, the ETFs are the TRs. (2) If an ETF/ATF is 1.0, then the torque ratio will be 1.0, regardless of ambient temperature.

NOTE: Ratio will be written to three decimal places--example .943.

NOTE: At this time compute and record **TRs** for cruise using cruise data and compute the **TRs** for arrival using arrival data.

5 Determine **MAX TORQUE AVAILABLE** (**MTA)** which is defined as the maximum amount of torque an engine can produce at 100% RPM R at a given PA and FAT. Use the appropriate MAXIMUM TORQUE AVAILABLE or CRUISE chart and the procedure described below to determine **MTA** for Departure, Cruise and Arrival.

NOTE: Certain FAT and PA combinations will exceed –10, Chapter 5 torque limitations. This item represents actual maximum torque available values. During aircraft operations, -10, Chapter 5 torque limitations shall not be exceeded.

a **Step 1:** Enter the MAXIMUM TORQUE AVAILABLE chart at the departure FAT then move right to the departure PA.

b **Step 2:** Move down to read the SPECIFICATION TORQUE AVAILABLE PER ENGINE ~ %.

c **Step 3:** If the ATF or ETF is less than 1.0, multiply the specification torque by the torque ratio to obtain maximum torque available. An alternate method is to continue down to the TORQUE RATIO line, move left to read the maximum TORQUE AVAILABLE ~ % per engine.

d **Step 4:** Repeat for each engine and record both **single engine MAX TORQUE(s) AVAILABLE** departure.

e **Step 5:** Determine the average of MTA #1 and #2. Record as **dual engine MAX TORQUE AVAILABLE** departure.

NOTE: Adjust maximum torque available as required for planned use of engine anti-ice and/or cockpit heater according to the –10.

f **Step 6:** Repeat steps 1 through 5 using cruise PA and FAT. Record **MAX TORQUE(s) AVAILABLE** cruise.

g **Step 7:** Repeat steps 1 through 5 using arrival PA and FAT. Record **MAX TORQUE(s) AVAILABLE** arrival.

6 Determine **MAX ALLOWABLE GWT OGE** (departure & arrival) which is defined as the most weight the aircraft is able or allowed to lift Out of Ground Effect at zero airspeed and 100% RPM R at given pressure altitude and FAT. Use the appropriate HOVER chart to compute maximum allowable gross weight for OGE as described below.

a **Step 1:** Enter the HOVER chart at the TORQUE PER ENGINE ~ % (OGE) at the dual engine MAX TORQUE AVAILABLE departure then move right to the GROSS WEIGHT ~ 1000 LB chart.

b **Step 2:** Reenter the HOVER chart at the departure FAT and move right to the departure PA, then move down to the GROSS WEIGHT ~ 1000 LB chart. Read the maximum allowable gross weight OGE at the intersection of this step and step 1 above. Record the **MAX ALLOWABLE GWT OGE** departure.

c **Step 3:** Compare **MAX ALLOWABLE GWT OGE** departure with the planned or actual aircraft gross weight to determine if aircraft is within 3,000 pounds.

d. **Step 4:** To determine **MAX ALLOWABLE GWT** arrival, repeat steps 1 and 2 utilizing arrival data (FAT, PA, and planned/actual aircraft gross weight) and **MAX TORQUE AVAILABLE** arrival.

e. **Step 5:** Compare **MAX ALLOWABLE GWT** arrival with the planned or actual aircraft gross weight to determine if aircraft is within 3,000 pounds.

7 Determine **MAX ALLOWABLE GWT** cruise which is defined as is the most weight the aircraft is able or allowed to weight and maintain level flight at 100% RPM R at given pressure altitude and FAT. Use the appropriate CRUISE chart to compute maximum allowable gross weight for cruise as described below.

a **Step 1:** Enter the appropriate CRUISE chart at **MAX TORQUE AVAILABLE** cruise.

b **Step 2:** Move up to the intersection of MAXIMUM END AND R/C line then read and record the **MAX ALLOWABLE GWT** cruise.

c **Step 3:** Compare **MAX ALLOWABLE GWT** cruise with the planned or actual aircraft gross weight to determine if aircraft is within 3,000 pounds.

NOTE: If the maximum torque available line is right of the gross weight lines, enter maximum gross weight according to the -10, Chapter 5 limits.

E. ENABLING LEARNING OBJECTIVE (ELO) #5:

ACTION: Complete the departure section of the PPC.

CONDITION: Given TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, the environmental conditions for departure, takeoff gross weight, and the ETF's for the #1 and #2 Engines.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, and classroom instruction.

a. **PA** – *(PREVIOUSLY ENTERED)*

b. **FAT** – *(PREVIOUSLY ENTERED)*

NOTE: Maximum pressure altitude and temperature will be used when computing all items in the departure section except Predicted Hover Torque. Predicted Hover Torque will be computed using forecast temperature and PA at time of departure.

c. **AIRCRAFT GWT** – *(PREVIOUSLY ENTERED)*

d. **FUEL WIGHT** – Record total planned fuel weight (internal and/or external) at takeoff.

e. **STORES WEIGHT** – Record the planned jettisonable weight of the ESSS stores.

f. **SLING WEIGHT** – Record the planned weight of the sling load.

g. **ATF**/**ETF** – *(PREVIOUSLY ENTERED)*

h. **TR** – *(PREVIOUSLY COMPUTED)*

i. **MAX TORQUE AVAILABLE** - *(PREVIOUSLY COMPUTED)*

j. **MAX ALLOWABLE GWT OGE** / **IGE** *(OGE PREVIOUSLY COMPUTED)* is the most weight the aircraft is able or allowed to lift Out of Ground Effect (OGE) and In Ground Effect (IGE) at zero airspeed and 100% RPM R at given pressure altitude and FAT. Use the appropriate HOVER chart to compute maximum allowable gross weight for OGE/IGE as described below. Annotate the computed maximum allowable gross weight OGE/IGE or the maximum gross weight per –10, Chapter 5, whichever is less.

NOTE: If OGE capability does not exist, the MAX HOVER HEIGHT IGE must be computed.

NOTE: If the dual engine maximum torque available exceeds the transmission torque limits, use the DUAL ENGINE TRANS LIMIT line to compute the maximum allowable weight OGE.

(1) **MAX ALLOWABLE GWT OGE** *(PREVIOUSLY COMPUTED)*

(2) **MAX ALLOWABLE GWT IGE**

(a) **Step 1:** Enter the HOVER chart at the TORQUE PER ENGINE ~ % (IGE) at the dual engine MAX TORQUE AVAILABLE then move up to the desired IGE WHEEL HEIGHT ` FT (normally the 10-ft line), then move right to the GROSS WEIGHT ~ 1000 LB chart.

(b) **Step 2:** Reenter the HOVER chart at the appropriate FAT and move right to the appropriate PA, then move down to the GROSS WEIGHT ~ 1000 LB chart. Read the Max Allowable GWT IGE at the intersection of this step and step 1 above. Record the **MAX ALLOWABLE GWT IGE**.

k. **GO/NO-GO TORQUE OGE/IGE** – GO/NO-GO torque is essentially a weight check at a hover height of 10 feet. These torque values will determine if the aircraft weight is at or below your Max Allowable GWT OGE/IGE. Use the appropriate HOVER chart as described below.

(1) **OGE** – Use Maximum Allowable Gross Weight OGE.

(a) **STEP 1:** Enter the chart at the appropriate FAT.

(b) **STEP 2:** Move right to the appropriate PA.

(c) **STEP 3:** Move down to the weight(s) computed for **MAX ALLOWABLE GWT OGE/IGE**.

(d) **STEP 4:** Move left to the 10-foot hover line (or WHEEL HEIGHT ~ FT that will be used to check the GO/NO-GO.

(e) **STEP 5:** Move down to read the GO/NO-GO torque value(s). Record the **GO/NO-GO TORQUE OGE**.

(2) **IGE:** - Repeat steps 1 through 5 above using Maximum Allowable Gross Weight IGE. Record **GO/NO-GO IGE**.

NOTE: When the actual temperature is less than maximum, the torque required to hover at a given gross weight is less. To ensure that structural limits are not exceeded, or that OGE capabilities exist at maximum forecast temperature, reduce GO/NO-GO by 1% for each 10°C that actual temperature is less than maximum forecast temperature. (TC 1-212)

l. **MAX HOVER HEIGHT IGE** – If OGE capability does not exist, use the appropriate hover chart to compute the MAX HOVER HEIGHT IGE, as described below.

(1) **STEP 1:** Enter the HOVER chart at the appropriate FAT and move right to the appropriate PA, then move down to the take-off Gross Weight (plus sling load weight if applicable), then move left to the WHEEL HEIGHT ~ FT lines.

(2) **STEP 2:** Reenter the bottom of the HOVER chart at the TORQUE PER ENGINE ~ % (IGE) at the Dual Engine MAX TORQUE AVAILABLE then up to the intersection from Step 1 above. Interpolate hover height as required. Record the **MAX HOVER HEIGHT IGE**.

m. **PREDICTED HOVER TORQUE (Dual-Engine and Single-Engine)** is the torque required to maintain a hover at predicted takeoff gross weight and takeoff conditions. Use the appropriate HOVER chart as described below for torque required to hover. Use AIRCRAFT GWT and takeoff PA and FAT.

(1) **PREDICTED HOVER TORQUE (Dual Engine)**

(a) **STEP 1:** Enter the chart at the takeoff FAT.

(b) **STEP 2:** Move right to the takeoff PA.

(c) **STEP 3:** Move down to planned aircraft gross weight.

(d) **STEP 4:** Move left to the 10-foot hover line (or WHEEL HEIGHT that will be used)

(e) **STEP 5:** Move down to read and record **Dual Engine PREDICTED HOVER TORQUE**.

(2) **PREDICTED HOVER TORQUE (Single-Engine)** – Double the PREDICTED HOVER TORQUE value that was computed for PREDICTED HOVER TORQUE (Dual Engine). If the value exceeds the appropriate MAX TORQUE AVAILABLE (Single-Engine), record NA in the appropriate block(s). Record **Single-Engine PREDICTED HOVER TORQUE.**

n. **MIN SE – IAS – W/O STORES** / **W/STORES** are the slowest airspeed's that the aircraft can maintain level flight with and without external stores. Use the appropriate CRUISE chart to determine the minimum single-engine airspeed with and without external stores as described below.

NOTE: If the aircraft will be operating without external stores, record NA in the w/stores block.

NOTE: External stores are defined as a sling load, ESSS wing stores, or both.

(1) **Step 1:** Enter the bottom of the cruise chart at ½ the Single-Engine MAX TORQUE AVAILABLE for the low ETF engine, but no more than ½ of the TRANSMISSION TORQUE LIMIT.

(2) **Step 2:** Move up to the first intersection of aircraft gross weight (without external stores). Read left or right for IAS. Record **MIN SE - IAS – W/O STORES**.

NOTE: If aircraft is operating with external stores, repeat steps 1 and 2 above using aircraft gross weight with external stores and record **MIN SE - IAS – W/ STORES**.

F. ENABLING LEARNING OBJECTIVE (ELO) #6:

ACTION: Complete the Remarks Section of the PPC.

CONDITION: Given TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, the environmental conditions for departure, takeoff gross weight, and the ETF's for the #1 and #2 Engines.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, and classroom instruction.

a. Record mission information such as drag factors, fuel requirements, and GO/NO-GO for sling loads.

G. ENABLING LEARNING OBJECTIVE (ELO) #7:

ACTION: Complete the cruise section of the PPC.

CONDITION: Given TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, the environmental conditions for cruise, takeoff gross weight, ETF's for the #1 and #2 Engines, and the desired indicated airspeeds.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, and classroom instruction.

a. Cruise information is obtained from the appropriate cruise charts found in Chapter 7 of TM 1-1520-237-10.

b. Cruise charts are broken down by PA (2,000-foot increments) and FAT (10° increments).

NOTE: Ensure the cruise chart you are using has the proper PA, FAT, engine model, and drag configuration for your mission.

c. **PA** – *(PREVIOUSLY ENTERED)*

d. **FAT** – *(PREVIOUSLY ENTERED)*

e. **TR** – (*PREVIOUSLY COMPUTED)*

f. **MAX TORQUE AVAILABLE** – *(PREVIOUSLY COMPUTED)*

g. **CT (critical torque)** – is the dual-engine torque value, which when exceeded, may not allow the aircraft to maintain % RPM R within normal limits under single-engine operations in the same flight conditions. Record **CT** as ½ maximum torque available of the engine with the lowest ETF.

WARNING: During dual-engine flight, conditions that require torque settings greater than the critical torque indicates the pilot is operating outside the aircraft low ETF single-engine capability. If operating dual-engine above the CT and an engine fails, malfunctions or must be shut down, the pilot, in these circumstances, must immediately adjust torque, airspeed, and/or gross weight to establish single-engine capability.

h. **MIN** / **MAX Vh – IAS (Dual Engine)** are the slowest and fastest airspeeds that the aircraft can maintain level flight while operating dual engine at a given weight, PA and TEMP. Use the appropriate CRUISE chart to compute the minimum/maximum Vh indicated airspeeds as describe below.

(1) **Clean and high drag configuration.**

(a) **Step 1:** Enter the cruise chart at the MAX TORQUE AVAILABLE for CRUISE.

(b) **Step 2:** Move up to the first intersection of AIRCRAFT GWT. Read left or right for minimum IAS. Record the **Dual-Engine MIN Vh – IAS**. If the maximum torque available line is right of the gross weight, record 0 for **Dual-Engine MIN Vh – IAS**.

(c) **Step 3:** Continue up to the second intersection of AIRCRAFT GWT. Read left or right for maximum IAS. Record the **Dual-Engine MAX Vh – IAS**.

NOTE: If the maximum torque available line is to the left of (does not intersect) the AIRCRAFT GWT DEPARTURE, the aircraft cannot maintain dual engine level flight for the conditions. MAX ALTITUDE – MSL must be computed and a new cruise altitude selected.

(2) **Alternative or external load configuration**.

(a) For alternative or external load configurations, refer to the –10, Chapter 7, Section VI, DRAG and TC 1-212 (ATM).

i. **CRUISE – IAS / TAS (Dual-Engine)** – Record planned **CRUISE – IAS**. Enter the CRUISE chart at cruise IAS and move laterally to the outer TRUE AIRSPEED ~ KTS scale. Record **Dual-Engine CRUISE TAS**.

(1) IAS for classroom purposes is 120 knots (actual airspeed is based on mission requirements).

j. **CRUISE / CONTINUOUS TORQUE (Dual-Engine)** - Cruise Torque is defined as the torque required to maintain flight in cruise conditions at planned cruise IAS. Continuous torque is defined as the power which may be applied while avoiding the engine 30 minute limits. Use the appropriate CRUISE chart to compute the torque required for cruise and continuous torque available as described below.

NOTE: The continuous torque line represents the minimum torque available for ATF's of .95 or greater. Thirty-minute limits may be encountered at a different torque value based on actual ATF.

(1) **Clean and high drag configuration**.

(a) **Step 1:** Enter the CRUISE chart at the selected cruise IAS from above. Move left or right as appropriate to the aircraft Gross Weight (plus sling load if applicable).

(b) **Step 2:** Move down to the TORQUE PER ENGINE ~ % line to read the CRUISE torque. Record the **Dual-Engine CRUISE TORQUE**.

(c) **Step 3:** Reenter the CRUISE chart at the selected cruise IAS from above. Move left or right as appropriate to the TORQUE AVAILABLE – CONTINUOUS line.

(d) **Step 4:** Move straight down (do not follow the slant of the line) to the TORQUE PER ENGINE ~ % to read the CONTINUOUS torque. Record the **Dual-Engine CONTINUOUS TORQUE**.

NOTE: If the selected CRUISE IAS is below the depicted TORQUE AVAILABLE – CONTINUOUS line, use the torque value indicated by the lowest extreme of the TORQUE AVAILABLE – CONTINUOUS line.

NOTE: Adjust CRUISE / CONTINUOUS TORQUE for planned use of engine anti-ice and/or heater.

(2) **Alternative or external load configuration.**

(a) For alternative or external load configurations, refer to the –10, Chapter 7, Section VI, DRAG and TC 1-212 (ATM).

k. **CRUISE FUEL FLOW (Dual-Engine).**

(1) **Cruise Chart Method.** Use the appropriate CRUISE chart.

(a) **Step 1:** Enter the bottom of the chart at the cruise torque value computed above.

(b) **Step 2:** Move up to TOTAL FUEL FLOW ~ 100 LB/HR and read cruise fuel flow. Record the **dual-engine CRUISE FUEL FLOW**.

NOTE: Adjust as required for planned use of engine anti-ice, cockpit heater and HIRRS installation.

(2) **Engine fuel flow chart method.** Use the SINGLE/DUAL ENGINE FUEL FLOW chart as per the –10, Chapter 7, Section VIII, FUEL FLOW and TC 1-212 (ATM).

l. **MAX END – IAS** / **TORQUE** and **MAX RANGE – IAS** / **TORQUE** - MAX ENDURANCE - IAS is defined as the GWT and airspeed combination that will allow the most time aloft. MAX RANGE – IAS is defined as the GWT and airspeed combination that will result in the greatest flight range (distance) per lb. of fuel. Use the appropriate CRUISE chart to compute maximum endurance indicated airspeed/torque and maximum range indicated airspeed/torque as described below.

(1) **Clean and high drag configuration.**

(a) **Step 1:** Enter the bottom of the appropriate cruise chart at AIRCRAFT GWT. Move up along the gross weight line to the intersection of the gross weight line and the MAX END AND R/C line. Move left or right as required to the IAS value then read maximum endurance indicated airspeed. Record **MAX END – IAS**. Move straight down to the TORQUE PER ENGINE ~ % line, then read torque for the maximum endurance indicated airspeed. Record **MAX END - TORQUE**.

(b) **Step 2:** Continue up along the gross weight line to the intersection of the gross weight line and the MAX RANGE line. Move left or right as required to the IAS, then read maximum range indicated airspeed. Record **MAX RANGE – IAS**. Move straight down to the TORQUE PER ENGINE ~ % line, then read torque for the maximum range indicated airspeed. Record **MAX RANGE -** / **TORQUE**.

(2) **Alternative or external load configuration**.

(a) For alternative or external load configurations, refer to the –10, Chapter 7, Section VI, DRAG and TC 1-212 (ATM).

m. **MAX R/C - IAS** / **TORQUE** is defined as applying the MAX torque available for the day (dual engine) and adjusting airspeed for MAX R/C resulting in the fastest climb rate (FPM) for the given conditions. Use the MAX END – IAS from above, and desired torque setting as described below.

(1) **Step 1:** Use the MAX TORQUE AVAILABLE dual-engine CRUISE. Record this value for **MAX R/C - TORQUE.** Subtract **MAX END – TORQUE** from **MAX R/C - TORQUE** to find the TORQUE INCREASE – PER ENGINE - % TRQ.

(2) **Step 2:** Use the CLIMB/DESCENT charts in the -10, Chapter 7, Section VII. Enter the bottom of the Climb/Descent chart for clean or high drag as appropriate at the TORQUE INCREASE – PER ENGINE - % TRQ using the value from Step 1 above.

(3) **Step 3:** Move up to the GROSS WEIGHT ~ 1000 LB line then move left to read the RATE OF CLIMB ~ FT/MIN.

(4) **Step 4:** Use the AIRSPEED SYSTEM CORRECTIONS charts in the -10, Chapter 7, Section IX. Enter the appropriate AIRSPEED SYSTEM CORRECTION chart for clean or high drag at the **MAX END – IAS**. Move up to the appropriate segmented line for the rate of climb value derived from Step 3 above (R/C greater or less than 1400 ft/min).

(5) **Step 5:** Move left to read the CORRECTION TO ADD ~ KNOTS. Add or subtract this value to/from the **MAX END – IAS**. Record the resultant **MAX R/C – IAS**.

n. **MAX ALLOWABLE GWT** (PREVIOUSLY COMPUTED) **and OPTIMUM IAS AT MAX ALLOWABLE GWT (dual-engine)** - Optimum IAS at Max Allowable GWT is the airspeed that must be flown in order to maintain level flight in cruise conditions while at Max Allowable GWT. Use the appropriate CRUISE chart to compute the maximum allowable gross weight and optimum indicated airspeed at maximum allowable gross weight as described below.

(1) **Clean and high drag configuration.**

(a) **Step 1:** Enter the bottom of the CRUISE chart at the MAX TORQUE AVAILABLE cruise.

(b) **Step 2:** Move up to the intersection of MAXIMUM END AND R/C line then read and record the indicating **Dual Engine MAX ALLOWABLE GWT** (PREVIOUSLY COMPUTED). Read left or right for optimum indicated airspeed (IAS ~ KTS) at maximum allowable gross weight. Record **Dual Engine OPTIMUM IAS AT MAX ALLOWABLE GWT**. If the maximum torque available line is right of the gross weight lines, enter the maximum gross weight according to the –10, Chapter 5 limits then read left or right from the respective value for optimum indicated airspeed at the maximum allowable gross weight.

(2) **Alternative or external load configuration.**

(a) For alternative or external load configurations, refer to the –10, Chapter 7, Section VI, DRAG and TC 1-212 (ATM).

m. **MIN / MAX Vh – IAS (single-engine)** Use the appropriate CRUISE chart to compute the minimum/maximum Vh indicated airspeeds single-engine, as described below.

(1) **Clean and high drag configuration.**

(a) **Step 1:** Enter the bottom of the CRUISE chart at ½ the maximum torque available for the low ETF engine, but no more than ½ of transmission torque limit single-engine.

(b) **Step 2:** Move up to the first intersection of the AIRCRAFT GWT DEPARTURE then read left or right for minimum Vh IAS ~ KTS. Record the **single-engine MIN Vh – IAS**.

(c) **Step 3:** Continue up to the second intersection of the AIRCRAFT GWT DEPARTURE then read left or right for maximum Vh IAS. Record the **single-engine MAX Vh – IAS**.

NOTE: If the maximum torque available line is to the left of (does not intersect) the AIRCRAFT GWT DEPARTURE, the aircraft cannot maintain single-engine level flight for the conditions. MAX ALTITUDE-MSL must be computed. As fuel is burned, single-engine capability during the flight may be possible.

(2) **Alternative or external load configuration.**

(a) For alternative or external load configurations, refer to the –10, Chapter 7, Section VI, DRAG and TC 1-212 (ATM).

n. **CRUISE SPEED – IAS / TAS (single-engine)** - Select an IAS that falls within the range of MIN / MAX Vh – IAS. Convert to TAS as previously described.

NOTE: Do not confuse single-engine cruise speed with emergency single-engine airspeed. The emergency single-engine airspeed is the speed used immediately following an emergency that requires adjustment to a single-engine airspeed. Single-engine cruise speed and associated data is used in the pre-mission planning process. In the event an engine fails, malfunctions or must be shut down, and single-engine operations are possible but landing is not practical (such as over water, jungle, densely forested areas, mountainous terrain or other impractical landing areas), the single-engine cruise speed may be used after establishing emergency single-engine speed when required to reach the intended landing area. The single-engine cruise speed may, in some instances, equal the emergency single-engine speed.

o. **CRUISE/CONTINUOUS TORQUE (single-engine)** - Use the appropriate CRUISE chart to compute torque required for cruise and continuous torque (single-engine), as described below.

(1) **Clean and High Drag configuration**.

(a) **Step 1:** Enter the CRUISE chart at the selected single-engine cruise IAS. Move left or right as appropriate to the aircraft GW ~ 1000 LB DEPARTURE.

(b) **Step 2:** Move down to the TORQUE PER ENGINE ~ % line to read the CRUISE torque, then double the torque value. Record the **single-engine CRUISE/… TORQUE**.

(c) **Step 3:** Reenter the CRUISE chart at the selected CRUISE – IAS. Move left or right as appropriate to the TORQUE AVAILABLE - CONTINOUS line.

(d) **Step 4**: Move straight down (do not follow the slant of the line) to the TORQUE PER ENGINE ~ % to read the CONTINUOUS torque. Record the **single-engine …/CONTINUOUS TORQUE**. NOTE: If selected CRUISE ~ IAS line is below the depicted TORQUE AVAILABLE – CONTINOUS line, use the torque value indicated by the lowest extreme of the TORQUE AVAILABLE ~ CONTINUOUS line.

NOTE: Adjust CRUISE / CONTINUOUS TORQUE for planned use of engine anti-ice and/or heater.

(2) **Alternative or external load configuration.**

(a) For alternative or external load configurations, refer to the –10, Chapter 7, Section VI, DRAG and TC 1-212 (ATM).

p. **CRUISE FUEL FLOW (single-engine).**

(1) **Cruise chart method** – Use the appropriate CRUISE chart.

(a) **Step 1:** Enter the bottom of the chart at torque value computed as **CRUISE TORQUE (single-engine)**.

(b) **Step 2:** Move up to TOTAL FUEL FLOW ~ 100 LB/HR and read the cruise fuel flow. Divide the cruise fuel flow value in ½. Record the **single-engine CRUISE FUEL FLOW**.

NOTE: Adjust as required for planned use of engine anti-ice and cockpit heater according to the -10.

(2) **Engine fuel flow chart method** - Use the SINGLE/DUAL ENGINE FUEL FLOW chart as per the –10, Chapter 7, Section VIII, FUEL FLOW and TC 1-212 (ATM).

q. **MAX ALLOWABLE GWT and OPTIMUM IAS AT MAX ALLOWABLE GWT (single-engine)** - Use the appropriate CRUISE chart to compute the maximum allowable gross weight, and optimum indicated airspeed at maximum allowable gross weight, single-engine, as described below.

(1) **Clean and high drag configuration.**

(a) **Step 1:** Enter the bottom of the CRUISE chart at ½ the single-engine MAX TORQUE AVAILABLE CRUISE, for the low ETF engine, but no more than one-half of transmission torque limit single-engine.

(b) **Step 2:** Move up to the intersection of MAX END AND R/C line then read the indicating maximum allowable gross weight. Record the **single-engine MAX ALLOWABLE GWT**. Read left or right for optimum IAS ~ KTS at maximum allowable gross weight. Record the **single-engine OPTIMUM IAS AT MAX ALLOWABLE GWT**.

NOTE: If the torque used does not intersect aircraft gross weight, the aircraft cannot maintain single-engine level flight for the conditions. **MAX ALTITUDE – MSL** must be computed. As fuel is burned, single-engine capability during the flight may be possible.

(2) **Alternative or external load configuration.**

(a) For alternative or external load configurations, refer to the –10, Chapter 7, Section VI, DRAG and TC 1-212 (ATM).

r. **MAX ALTITUDE – MSL** - When cruise flight, dual and/or single-engine, is not possible at the planned cruise pressure altitude CRUISE, use the appropriate CRUISE chart to compute the maximum altitude MSL as described below.

NOTE: Several different cruise charts may be referenced when selecting an optimum maximum cruise altitude, using a variety of temperature, altitude, aircraft gross weight and cruise IAS combinations.

(1) **Dual-engine.**

(a) **Step 1:** Enter the appropriate cruise chart at the maximum torque available for that chart. Move up to the second intersection of the aircraft gross weight DEPARTURE.

(b) **Step 2:** Move left or right to read the IAS ~ KTS. If the indicated IAS ~ KTS is less than the planned cruise IAS, adjust planned temperature, altitude, IAS and/or gross weight combinations to find a suitable cruise altitude. Record the **dual-engine MAX ALTITUDE – MSL**.

(2) **Single-engine.**

NOTE: When the capability to maintain level flight after an engine failure or malfunction is not possible, continued flight may be possible by descending to a lower pressure altitude. Adjust to the appropriate maximum endurance indicated airspeed and adjust collective to the maximum torque available to attain minimum rate of descent as required.

(a) **Step 1:** Enter the appropriate CRUISE chart at ½ single-engine MAX TORQUE AVAILABLE CRUISE of the lowest ETF engine.

(b) **Step 2:** Move up until intersecting the MAX END AND R/C line and interpolate the maximum gross weight. If the interpolated maximum gross weight is less than the aircraft gross weight DEPARTURE, progressively use lower altitude/temperature combination CRUISE charts until interpolated gross weight is at or greater than the aircraft gross weight. Record the **single-engine MAX ALTITUDE – MSL**.

WARNING: If allowable altitude/temperature combination cruise charts do not yield a gross weight greater than/or equal to the AIRCRAFT GWT DEPARTURE, level flight is not possible. Record NA in **MAX ALTITUDE – MSL (single-engine)**.

NOTE: Changes in maximum torque available due to changes in pressure altitude and temperature may be derived from the -CL tabular performance data.

s. **EMERGENCY SE – IAS** - This value is the emergency single-engine airspeed based on the mission and briefed to the crew for the purpose of crew coordination. This airspeed is selected from the MIN / MAX Vh - IAS range computed previously and is used immediately following an emergency that requires adjustment to a single-engine airspeed. When an aircraft does not have single-engine capability, the MAX END - IAS or the OPTIMUM IAS AT MAX ALLOWABLE GWT, as appropriate, should be briefed as the emergency single-engine airspeed.

NOTE: Normally only one EMERGENCY SE – IAS is selected. However, when the MIN / MAX Vh – IAS range is wide, the crew may select two emergency single engine airspeeds.

NOTE: There is no power margin available when operating single-engine at the MIN / MAX Vh - IAS. These airspeeds are computed using the maximum torque available single-engine for the lowest ETF engine. It is not recommended that the aircraft be flown at airspeeds that require maximum power for continued single-engine flight.

t. **MAX ANGLE** - Use the AIRSPEED FOR ONSET OF BLADE STALL chart in the -10, Chapter 5, to compute the maximum bank angle for the planned cruise IAS as described below.

(1) **Step 1:** Enter the chart at the cruise PRESSURE ALTITUDE ~ 1000 FT. Move right to the cruise temperature FAT ° C.

(2) **Step 2:** Move down to the aircraft GROSS WEIGHT ~ 1000 LBS (plus sling load weight if applicable) DEPARTURE data then move left to the ANGLE OF BANK ~ DEG chart.

(3) **Step 3:** Reenter the chart at the INDICATED AIRSPEED ~ KTS at the planned cruise airspeed, then move up to the ANGLE OF BANK ~ DEG chart. Record derived **MAX ANGLE** or 60° whichever is less.

u. **Vne – IAS** is defined as velocity never to exceed due to structural limitations, and avoidance of the likelihood of encountering compressibility or retreating blade stall (FM 1-203). Use the appropriate AIRSPEED OPERATING LIMITATIONS chart of the -10, Chapter 5, to compute the velocity not to exceed as described below.

(1) **Step 1:** Enter the chart at the cruise FREE AIR TEMPERATURE ~ ° C. Move right to the cruise PRESSURE ALTITUDE ~ FT.

(2) **Step 2:** Move down to the aircraft GROSS WEIGHT ~ LBS (plus sling load weight if applicable) DEPARTURE. If the COMPRESSIBILITY LIMITS ~ FAT or the MACH LIMIT dashed temperature line (-10 to -50 ° C) is reached prior to the aircraft GROSS WEIGHT ~ LBS, stop there.

(3) **Step 3:** Move left to the MAXIMUM INDICATED AIRSPEED (VNE) ~ KNOTS line for the Vne value. Record **Vne-IAS**.

NOTE: If temperature (MACH) limits are encountered prior to reaching gross weight, read left for VNE KIAS. This will ensure that compressibility will not be encountered.

H. ENABLING LEARNING OBJECTIVE (ELO) #8:

ACTION: Complete the arrival section of the PPC.

CONDITION: Given TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, the environmental conditions for arrival, arrival gross weight, and the ETF's for the #1 and #2 Engines.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, and classroom instruction.

NOTE: Complete this section if arrival conditions at destination differ significantly from departure conditions as defined in TC 1-212, Task 1004, DESCRIPTION Item 2b..

a. **PA**. – *(PREVIOUSLY ENTERED)*

b. **FAT** – *(PREVIOUSLY ENTERED)*

c. **LANDING GWT** – *(PREVIOUSLY ENTERED)*

d. **TR** – *(PREVIOUSLY COMPUTED)*

e. **MAX TORQUE AVAILABLE** – *(PREVIOUSLY COMPUTED)*

f. **MAX ALLOWABLE GWT OGE/IGE** – *(MAX ALLOWABLE GWT OGE WAS PREVIOUSLY COMPUTED)* Compute and record **MAX ALLOWABLE GWT IGE** the same as in the DEPARTURE section, using forecast arrival pressure altitude and temperature.

g. **MAX HOVER HEIGHT IGE** - If OGE capability does not exist, compute the maximum hover height IGE the same as in the DEPARTURE section, using arrival forecast pressure altitude and temperature.

h. **MIN SE – IAS - W/O STORES** / **W/STORES** - Compute the minimum single-engine airspeed with external stores and without external stores the same as in the DEPARTURE section, using arrival forecast pressure altitude and temperature.

I. ENABLING LEARNING OBJECTIVE (ELO) #9:

ACTION: Determine zero fuel weight.

CONDITION: Given a blank DA Form 5703-R, TC 1-212, TM 1-1520-237-10, 1-1520-237-CL, hover torque, wheel height, indicated fuel, temperature and PA.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, and classroom instruction.

a. **ZERO FUEL WEIGHT** is the total weight of the aircraft and load (including external stores, sling load, internal cargo, crew etc.) minus the weight of fuel on board. Use the appropriate HOVER chart from the –CL to compute ZERO FUEL WEIGHT as described below.

(1) **Step 1:** Note FAT, PA, and total indicated fuel weight.

(2) **Step 2:** While at a hover, note wheel height and hover torque.

(3) **Step 3:** Enter the HOVER chart at the noted FAT. Move down to the noted PA then left to the GROSS WEIGHT ~ 1000 LB chart.

(4) **Step 4:** Reenter the HOVER chart at the TORQUE PER ENGINE ~ % (IGE) at the noted hover torque. Move up to the WHEEL HEIGHT ~ FT for the noted hover height, then move right to the intersection of step 3 above. Note aircraft gross weight.

(5) **Step 5:** Subtract the noted total indicating fuel weight from the gross weight computed in step 4. Record the adjusted **ZERO FUEL WEIGHT**.

NOTE: Although data needed to compute ZERO FUEL WEIGHT is noted at a hover, the calculation may be made on the ground or, if not practical, shortly after takeoff or level off.

J. ENABLING LEARNING OBJECTIVE (ELO) #10:

ACTION: Update the 5703-R (PPC).

CONDITION: Given a completed 5703-R, TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, indicated fuel, and updated takeoff and/or landing environmental conditions.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, and classroom instruction.

a. **Updates.** The PPC may be updated in flight or on the ground as the mission progresses. Updates are required when there is an intent to land and/or takeoff and when operating within 3,000 pounds of the MAX ALLOWABLE GWT (OGE), there is an increase of 500-feet pressure altitude, and/or 5 ° C from the planned PPC.

(1) **Update AIRCRAFT WEIGHT** - Update the aircraft weight as described below.

(a) **When internal and/or external load weights have not changed** - Add the total remaining indicated fuel weight (internal/external) to the zero fuel weight.

(b) **When internal and/or external load weights have changed** - Perform a hover check to determine a readjusted zero fuel weight.

(2) **Update MAX TORQUE AVAILABLE** - Use the appropriate tabular performance date MAXIMUM TORQUE AVAILABLE table in the TM 1-1520-237-CL. as described below. *EXAMPLE Conditions = PA +8,000 , ATF .96 , FAT +10°C*

(a) **Step 1:** Read Max Torque Available at the intersection of PA and FAT (1.0 or 0.9 ATF).

NOTE: If the ATF is between 0.9 and 1.0, interpolate the maximum torque available as described in steps 2 through 5. *EXAMPLE Conditions = PA +8,000 , ATF .96 , FAT +10°C*

(b) **Step 2:** Determine a multiplication factor that reflects your aircraft ATF.
EXAMPLE: .96 ATF is 6/10 the difference between ATF .90 and 1.0. Multiplication factor is .6.

(c) **Step 3:** Determine Max Torques Available for a 0.9 ATF and 1.0 ATF.
EXAMPLE: 1.0 = 85%, .90 = 81%

(d) **Step 4:** Subtract Max Torque Available 0.9 ATF from the Max Torque Available 1.0 ATF.
EXAMPLE: 85 – 81 = 4%

(e) **Step 5:** Multiply the results of Step 4 by the multiplication factor from Step 2.
EXAMPLE: 4 x .6 = 2.4%

(f) **Step 6:** Add the results of Step 4 to the Max Torque Available 0.9 ATF.
EXAMPLE: 81 +2.4 = 83.4 % Max Torque Available for .96 ATF

(3) **Update MAX ALLOWABLE GWT OGE** - Use the appropriate maximum OGE HOVER WEIGHT AND TORQUE REQUIRED table in the TM 1-1520-237-CL as described below. *EXAMPLE Conditions = PA +8,000 , ATF .96 , FAT +10°C*

NOTE: At or below –15°C, the MAXIMUM OGE HOVER WEIGHT AND TORQUE REQUIRED (T700) table in the –CL presents data for ATF 1.0 only.

(a) **Step 1:** Read Max Allowable GWT OGE at the intersection of PA and FAT (1.0 or 0.9 ATF).

NOTE: The MAXIMUM OGE HOVER WEIGHT AND TORQUE REQUIRED (T700) chart in the –CL presents data for ATF's 0.9 and 1.0. Calculations must be made for ATF's between 0.9 and 1.0 as described in steps 2 through 5.

(b) **Step 2:** Determine a multiplication factor for your ATF relative to 0.9 ATF and 1.0 ATF.
EXAMPLE: .96 ATF is 6/10 the difference between ATF .90 and 1.0. Multiplication factor is .6.

(c) **Step 3:** Read Max Allowable GWT's at the intersection of PA and FAT (1.0 and 0.9)
EXAMPLE: 1.0 ATF = 17,300 pounds, .9 ATF = 16,600 pounds

(d) **Step 4:** Subtract the Max Allowable GWT 9.9 ATF from the Max Allowable GWT 1.0 ATF.
EXAMPLE: 17,300 – 16,600 = 700 pounds.

(e) **Step 5:** Multiply the results of Step 3 by the multiplication factor from Step 2.
EXAMPLE: 700 x .6 = 420 pounds

(f) **Step 6:** Add the results of Step 4 to the Max Allowable GWT .90 ATF.
EXAMPLE: 16,600 + 420 = 17,020 pounds Max Allowable GWT for .96 ATF.

(4) **Update GO/NO-GO OGE** - Use the appropriate MAXIMUM OE HOVER WEIGHT AND TORQUE REQUIRED table in the TM 1-1520-237-CL as described below. *EXAMPLE Conditions = PA +8,000 , ATF .96 , FAT +10°C*

NOTE: At or below –15°C, the MAXIMUM OGE HOVER WEIGHT AND TORQUE REQUIRED (T700) chart in the –CL presents data for ATF 1.0 only.

(a) **Step 1:** Read Go/No-go OGE at the intersection of PA and FAT (1.0 or 0.9 ATF).

NOTE: The MAXIMUM OGE HOVER WEIGHT AND TORQUE REQUIRED (T700) chart in the –CL presents data for ATF's .9 and 1.0. Calculations must be made for ATF's between 0.9 and 1.0 as described in steps 2 through 6.

(b) **Step 2:** Determine a multiplication factor for your ATF relative to 0.9 ATF and 1.0 ATF.
EXAMPLE: .96 ATF is 6/10 the difference between ATF .90 and 1.0. Multiplication factor is .6.

(c) **Step 3:** Read Torques Required to Hover Max Allowable GWT at 10 Feet (Q~IGE~%) at the intersection of PA and FAT for a (1.0 ATF and 0.9 ATF). *EXAMPLE: 1.0 ATF = 73%, 0.9 ATF = 69%*

(d) **Step 4:** Subtract .90 ATF Torque (Step 3) from 1.0 ATF Torque (Step 33).
EXAMPLE: 73% - 69% = 4%

(e) **Step 5:** Multiply the results of Step 3 by the multiplication factor from Step 1.
EXAMPLE: 4% x .6 = 2.4%

(f) **Step 6:** Add the results of Step 4 to the Torque Required to Hover Max Allowable GWT at 10 Feet (Q~IGE~%) for a 0.9 ATF. *EXAMPLE: 69% + 2.4% = 71.4% is GO/NO-GO OGE.*

K. ENABLING LEARNING OBJECTIVE (ELO) #11:

ACTION: Use tabular data and the cruise chart(s) to determine the requirement to complete the PPC (5703-R) in it's entirety.

CONDITION: Given a blank DA Form 5703-R, TC 1-212, and TM 1-1520-237-10, TM 1-1520-237-CL, all applicable environmental conditions, takeoff/landing gross weight(s), and the ETF's for the #1 and #2 Engines.

STANDARD: IAW TC 1-212, TM 1-1520-237-10, TM 1520-237-CL, and classroom instruction.

a. The 5703-R must be completed in it's entirety when the planned or actual aircraft gross weight for departure and/or arrival is within 3,000 pounds of the maximum allowable gross weight OGE or when the planned or actual gross weight is within 3,000 pounds of the maximum allowable gross weight for cruise.

The quickest way to determine if the 5703-R must be completed in it's entirety is to use tabular data in the –CL and the appropriate cruise chart.

(1) **Determine Max Allowable Gross Weight (OGE) for departure:**

(a) Use departure conditions (temp & PA), departure gross weight and the appropriate maximum OGE HOVER WEIGHT AND TORQUE REQUIRED table in the TM 1-1520-237-CL as previously described (ELO # 10).

(b) Compare **MAX ALLOWABLE GWT (OGE)** departure with the planned or actual aircraft departure gross weight to determine if aircraft is within 3,000 pounds.

(2) **Determine Max Allowable Gross Weight (OGE) for arrival**:

(a) Use arrival conditions (temp & PA), arrival gross weight and the appropriate maximum OGE HOVER WEIGHT AND TORQUE REQUIRED table in the TM 1-1520-237-CL as previously described (ELO # 10).

(b) Compare **MAX ALLOWABLE GWT (OGE)** arrival with the planned or actual aircraft arrival gross weight to determine if aircraft is within 3,000 pounds.

(3) **Determine Max Allowable Gross Weight for cruise:**

(a) Use cruise conditions (temp & PA), takeoff gross weight and the appropriate CRUISE CHART as previously described (ELO # 4).

(b) Compare **MAX ALLOWABLE GWT** cruise with the planned or actual aircraft departure gross weight to determine if aircraft is within 3,000 pounds.

UH-60 PERFORMANCE PLANNING CARD

For use of this form, see TC 1-212: The proponent agency is TRADOC.

DEPARTURE

AIRCRAFT GWT: **14,000** lbs	PA: **2,500** / **1,500**	FAT: **+25** °C / **+20** °C		
FUEL WEIGHT: **2,000** lbs	DUAL-ENGINE	SINGLE-ENGINE		
STORES WEIGHT: **NA** lbs		#1	#2	
SLING WEIGHT: **NA** lbs	ATF:	ETF: **1.0**	ETF: **.90**	
ZERO FUEL WEIGHT: lbs	TR:	TR:	TR:	
MAX TORQUE AVAILABLE	%	%	%	
MAX ALLOWABLE GWT OGE / IGE	/			
GO/NO-GO TORQUE OGE / IGE	% / %			
MAX HOVER HEIGHT IGE	ft			
PREDICTED HOVER TORQUE	%	%	%	
MIN SE-IAS - W/O STORES / W/STORES		kts /	kts	

REMARKS:

CRUISE

PA: **4,000** ft	FAT: **10** °C	MAX ANGLE: °	Vne-IAS: kts	
		DUAL-ENGINE	SINGLE-ENGINE #1	#2
		TR:	TR:	TR:
MAX TORQUE AVAILABLE	CT %	%	%	%
MIN / MAX Vh - IAS		kts/ kts	kts /	kts
CRUISE - IAS / TAS		/	kts/	kts
CRUISE / CONTINUOUS TORQUE		%/ %	%/	%
CRUISE FUEL FLOW		pph		pph
MAX END - IAS / TORQUE		kts/ %		
MAX RANGE - IAS / TORQUE		kts/ %		
MAX R/C - IAS / TORQUE		kts/ %		
MAX ALLOWABLE GWT		lbs		lbs
OPTIMUM IAS AT MAX ALLOWABLE GWT		kts		kts
MAX ALTITUDE - MSL		ft		ft
EMERGENCY SE - IAS				kts

DA FORM 5703-R

ARRIVAL

LANDING GWT: **13,200** lbs	PA: **2,800** ft	FAT: **+30** °C	
	DUAL-ENGINE	SINGLE-ENGINE #1	#2
	TR:	TR:	TR:
MAX TORQUE AVAILABLE	%	%	%
PREDICTED HOVER TORQUE	%	%	%
MAX ALLOWABLE GWT OGE / IGE	/		
MAX HOVER HEIGHT IGE	ft		
MIN SE-IAS - W/O STORES / W/STORES		kts /	kts

REMARKS:

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UH-60 PERFORMANCE PLANNING CARD

For use of this form, see TC 1-212: The proponent agency is TRADOC.

DEPARTURE

AIRCRAFT GWT: **20,250** lbs	PA: **2,500** / **1,500**	FAT: **+25** °C / **+20** °C		
FUEL WEIGHT: **2,000** lbs	DUAL-ENGINE	SINGLE-ENGINE		
STORES WEIGHT: **NA** lbs		#1	#2	
SLING WEIGHT: **NA** lbs	ATF:	ETF: **1.0**	ETF: **.90**	
ZERO FUEL WEIGHT: lbs	TR:	TR:	TR:	
MAX TORQUE AVAILABLE	%	%	%	
MAX ALLOWABLE GWT OGE / IGE	/			
GO/NO-GO TORQUE OGE / IGE	% / %			
MAX HOVER HEIGHT IGE	ft			
PREDICTED HOVER TORQUE	%	%	%	
MIN SE-IAS - W/O STORES / W/STORES		kts /	kts	

REMARKS:

CRUISE

PA: **8,000** ft	FAT: **-10** °C	MAX ANGLE: °	Vne-IAS: kts		
		DUAL-ENGINE	SINGLE-ENGINE		
			#1	#2	
		TR:	TR:	TR:	
MAX TORQUE AVAILABLE	CT %	%	%	%	
MIN / MAX Vh - IAS		**110** kts/ kts	kts /	kts	
CRUISE - IAS / TAS		/	kts/	kts	
CRUISE / CONTINUOUS TORQUE		%/ %	%/	%	
CRUISE FUEL FLOW		pph		pph	
MAX END - IAS / TORQUE		kts/ %			
MAX RANGE - IAS / TORQUE		kts/ %			
MAX R/C - IAS / TORQUE		kts/ %			
MAX ALLOWABLE GWT		lbs		lbs	
OPTIMUM IAS AT MAX ALLOWABLE GWT		kts		kts	
MAX ALTITUDE - MSL		ft		ft	
EMERGENCY SE - IAS				kts	

DA FORM 5703-R

ARRIVAL

LANDING GWT: **19,000** lbs	PA: **6,000** ft	FAT: **10** °C	
	DUAL-ENGINE	SINGLE-ENGINE	
		#1	#2
	TR:	TR:	TR:
MAX TORQUE AVAILABLE	%	%	%
PREDICTED HOVER TORQUE	%	%	%
MAX ALLOWABLE GWT OGE / IGE	/		
MAX HOVER HEIGHT IGE	ft		
MIN SE-IAS - W/O STORES / W/STORES		kts /	kts

REMARKS:

Hover Check Info:

PA = 2,000
FAT = 22 C
Indicated Fuel = 1,900
Hover Height = 10
Hover Torque = 89%

Temp's @ Altitude:

8,000' = -10 C
6,000' = 10 C
4,000' = 15 C
2,000' = 20 C

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